SOILutions

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PHOSPHORUS PROJECT UPDATE

A team of Western Canadian researchers is in the second year of a three year project aimed at increasing our knowledge of soil and fertilizer phosphorus. The group is measuring the yield response of spring wheat, barley and canola to incremental additions of phosphate fertilizer. They are also evaluating a number of different phosphorus soil tests. The soil test and crop response data will be used to develop a more accurate fertilizer recommendation system.

Researchers performed similar experiments in Alberta in the early 70's, but since that time a number of factors in the crop response equation have changed. Many fields have received annual inputs of phosphorus that in total far exceed crop removal. Our traditional soil tests may not measure this residual phosphorus even though a portion of it is crop available. Crop varieties have also changed in the past two decades as has fertilizer application equipment. The research team is hopeful that one of the newer soil tests will provide a better correlation between fertilizer additions and crop response than the traditional tests.

With 46 sites in Alberta and the addition this year of sites in Saskatchewan and Manitoba, the phosphorus project covers to much territory for one individual or group to handle. To beat the distance problem, project manager Ross McKenzie of Alberta Agriculture assembled regional teams. Garry Coy and staff (Field Services, Alberta Agriculture) are performing

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SOIL COMPACTION, A Few More Thoughts

Jerome Lickacz

So you think soil compaction from tillage and harvesting operations is the reason your canola is not averaging 30 to 40 bu/ac. Well the fact of the matter is that there has been no long term research on soil compaction in Western Canada. There is not a good knowledge base to evaluate the soil compacting effects of different farming operations or the ameliorating effects of such practices as deep plowing and subsoiling.

It is true that deep plowing and subsoiling have been studied in Alberta for over 20 years, but this work was performed on Solonetzic soils. There is a difference between the hardpan or Bnt horizon in a Solonetz and the compaction caused by field operation. The former has a chemical origin. Solonetzic soils developed naturally where high sodium levels were present in the parent material or were introduced into the soil from below by capillary rise of saline ground water. Compaction on the other hand is caused by a physical process. The downward and shearing force of tires and cultivation implements compresses the soil. Although Bnt hardpans and compaction are caused by different processes, some of the observations made on Solonetzic soils may be applicable to other soil types.

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Alberta Agriculture

Phosphorus cont.

the field work in the Peace River country, while a crew led by Doug Penney and Elston Solberg, (Alberta Agriculture) is covering north central Alberta. John Harapiak and Norm Flore (Westco Fertilizers Ltd.) have plots in south central Alberta as well as handling the out of province sites. This leaves Ross's group to handles southern Alberta.

Not all the work takes place in the field. Dan Heaney (Alberta Agriculture) is coordinating laboratory analysis, some of which is being performed by the Saskatchewan Soil Test Laboratory at Saskatoon. Len Kryzanowski (Alberta Agriculture) has taken on the job of project statistician.

With so many sites and teams involved, the group new that as simple an experimental design as possible would provide the most consistent results. Recommended varieties of spring wheat, barley and canola were grown at each site. Four phosphorus fertilizer treatments, 0, 15, 30 and 45 kg P_2O_5/ha, were applied to six replicates of each crop. All phosphorus fertilizer was seed placed except the 45 kg/ha rate for canola. It was two-thirds seed placed and one-third banded prior to seeding. Nitrogen and any other necessary fertilizers were also banded prior to seeding.

Typically, cereal crops take up to 70 per cent of their phosphorus requirements in the first 40 days after emergence. Furthermore, soil phosphorus is less available to crops under cool, wet conditions. Weather in the last two weeks of May and through June 1991 was wetter and cooler than normal. Team members were not surprised to see differences among wheat and barley treatments. The differences disappeared by mid-July leaving the team curious. Were the early symptoms predictive of yield response? When the plots had been harvested, the yield data showed that 80 per cent of wheat and canola sites and 90 per cent of barley sites had responded to phosphate fertilizer (Table 1).

In recent years, a number of agronomists have speculated that fertilizer additions have built up residual phosphorus to the point were rates can be cut back without yield loss. The 1991 data suggests that phosphorus is still a yield limiting factor on most soils. It will be interesting to see if this trend continues over the next two years of the project.

Assembling the funding for a major research project is always a challenge, and the $100,000 plus per year required for this project was no exception. Happily, the matching grant program of the Alberta Agricultural Research Institute makes projects such as this attractive to industry. Despite tough economic times, the Western Grains Research Foundation, the Alberta Canola Producers Commission, Sherritt Gordon, Esso, Westco, Cominco, and the Potash Phosphate Institute demonstrated their commitment to agriculture with donations of cash and service in kind. Without their help, McKenzie and company would never have got the project of the ground.

The first year of the phosphorus project produced very interesting results and the team was successful in meeting its research goals. Team members are optimistic that after three years of field studies, they will be able to give farmers much better advice on managing soil and fertilizer phosphorus.

-DJH

For more information call Ross McKenzie , Alberta Agriculture, Lethbridge, 381-5126.

Number of sites responding to phosphorus by crop and soil zone.

Crop	Response	Brown	Dk Brown	Thin Black	Black	Gray	Peace River	Total
Wheat	Positive	3	6	5	5	2	4	25
	Marginal	1	4	3	0	2	2	12
	None	2	4	2	2	0	1	11
Barley	Positive	3	10	7	5	4	5	34
	Marginal	2	1	3	1	0	2	9
	None	1	0	1	2	0	0	4
Canola	Positive	5	2	3	1	1	5	17
	Marginal	0	6	1	2	3	2	14
	None	1	3	1	1	0	1	7

Positive - yield increase greater then 5 bu/acre, Marginal - yield increase 2 to 5 bu/acre, None - yield increase less than 2 bu/acre.

Compaction cont.

One of the most frequently asked questions is, "How long do the positive effects of subsoiling last?" Two subsoiling trials established in 1978 have been monitored continuously to assess crop response. The trial in the Dark Brown soil zone northeast of Stettler was seeded to oats in the year of subsoiling. The subsoiled treatment produced 4.2 bu/ac more oats than the control during that initial year. Over the next 11 years, continuous wheat averaged 6.5 bu/ac better on the subsoiled treatment. The trial was seeded to barley in 1989 and the subsoiled treatment yielded 16.0 bu/ac better than the control. At the second site in the Brown soil zone east of Hanna, the average increase in wheat yields over 12 years was 2.1 bu/ac. Smaller yield increases at Hanna compared to Stettler reflect the limits placed on productivity by the drier climate.

At both locations, the positive crop response has not decreased with time suggesting that subsoiling may have a long term benefit to crop production. However, soil compaction is caused by field traffic which continues after a subsoiling treatment. Thus one would expect that the hardpan would reform over time.

Subsoiling trials in the Black and Gray soil zones are also being monitored. Initial results indicate substantial increases in yield may also be obtained in these areas. One must realize however that in these areas precipitation is more frequent and that in some years timely rainfall is sufficient to meet crop requirements even on solonetzic soils. No increase in yield is obtained under these conditions. Some farmers have observed that the improved internal drainage in subsoiled fields makes for a more rapid return to a trafficable condition after heavy rains. Other farmers have also found that the range of crops that can be successfully grown has increased after subsoiling.

It must be emphasized that subsoiling can increase crop yields in soils where a hardpan is limiting water and root penetration. In order to achieve positive results, the implement must effectively shatter the hardpan. If a hardpan (either solonetzic or caused by farming operations) is limiting crop yields on your farm, contact your district agriculturist, industry agronomist or the Soils and Crop Management Branch at 427-2530 for more detailed information on subsoiling ✪

MEMBRANE STRIP TESTING

Ross H. McKenzie
Soil Fertility Specialist, Lethbridge

A new method for assessing plant available nutrients in soil has been developed by the Department of Soil Science, University of Saskatchewan. The new method, called the "plant root simulator," uses anion and cation exchange membranes to mimic the nutrient absorbing action of plant roots. Membrane strips are buried in the soil at a depth of 3-4 inches for one hour and then removed. The strips can then be sent to the lab or analyzed on site using a soil test kit.

As with any new technology, there are problems that must be overcome. These include:

- Spatial variability: The variation in nutrient levels within a field is generally overcome by combining 15-20 cores into a representative sample. To bury 15-20 strips and then retrieve them one hour later would be require more time and effort than the one pass core method.

- Nutrients at Depth: For mobile nutrients such as nitrate-nitrogen and sulphate-sulphur, knowing the amounts to a depth of at least 12 and preferably to 24 inches is important in making fertilizer recommendations. Failure to take subsoil nutrients into account will result, in some cases, in over application of fertilizer. Farmers will get a lower return on their fertilizer dollars. Excess fertilizer may also pollute surface and ground waters. It would not be practical to bury strips to a depth of 24 inches at 15-20 sites in a field.

- Time, Temperature, Moisture: The amount of nutrient adsorbed by the strip depends on the time of exposure to the soil solution, thus the need for a precise burying time of one hour. Soil water content controls the amount of nutrient in soil solution and thus the adsorption rate. Variations in soil water are overcome by saturating the soil with water around the buried strip. Soil temperature is also a factor. The amount of nutrient adsorbed by the strip can be quite different in cool as compared to warm soils.

- In Field Analysis: If strips can be analyzed in the field, there will be a great advantage in turn around time compared to sending samples to the lab. There may also be some disadvantages. Field test kits only give a low, medium or high rating for each soil nutrient. Therefore, analysis in the field is generally not accurate enough to allow fertilizer recommendations based on marginal economic analysis. Also the advantage of having an agronomist working with the producer to develop a soil fertility program would be lost.

It is my opinion that membrane strips will find a place as a new analysis technique within a laboratory setting. That is samples will continue to be gathered in the traditional manner of coring and sending a representative sample to the laboratory. In the laboratory, samples will likely be extracted with a membrane strip and analyzed for nutrients. This approach could be used to eliminate sample handling procedures such as drying and grinding. It will also allow determination of N, P, K, and S as well as other nutrient elements on the basis of a single extractant.

The use of membrane strips has some limitations that must be overcome before the technology can be taken to the field. Despite the drawbacks, membrane strips are an exciting development. In fact we are currently evaluating membrane strips along with other new extracting methods such as the Kelowna extractant as part of our Phosphorus Soil Test Calibration Project.✡

ALBERTA'S MAJOR CROP NEGLECTED

L.M. Kryzanowski, P.Ag.
Crop Nutrition Agronomist
Alberta Agriculture

Dr. S.S. Malhi
Research Scientist
Agriculture Canada

What's Alberta's most important crop? It isn't wheat, barley, or canola. In terms of tonnage, acreage, and total value, forage is the hands down winner.

Forages are the major source of food for livestock and are also an important part of many sustainable agriculture cropping systems in Alberta. Well managed forage crops reduce soil erosion and help improve soil tilth and fertility. Despite their importance, forages are treated very poorly from a crop nutrition standpoint . Large amounts of nitrogen, phosphorus, potassium and sulphur are required for high forage yields. These nutrients are removed from the field as hay or silage and are not returned unless manure is applied. Of the 25 million acres of forage in Alberta, only 25 per cent receive fertilizer applications and much of that is fertilized at rates well below the economic optimum.

A strong, productive forage stand that lasts for several years is the goal of all producers. To accomplish this, fertilizer nutrients must be applied prior to seeding and regularly each year. Forages respond well to application of fertilizer when soils are deficient in nutrients. In Alberta, nitrogen and phosphorus are the most commonly deficient nutrients, while potassium and sulphur may also be deficient for certain forage crop and soil combinations. An efficient fertilizer program starts with the producer deciding on the type, timing and amount of fertilizer needed for optimum production. These decisions should be based on soil test results, forage type and moisture conditions.

Soil testing is particularly important. Test results allow us to diagnose nutrient deficiencies, identify potential soil acidity and salinity problems and provide the basis for recommending fertilizer rates. Soil testing should be done in the month prior to seeding a forage stand and then repeated each year before fertilizer is applied. Soil testing to diagnose stand problems should be done during the growing season while the symptoms are visible.

The effectiveness of a fertilizer application is influenced by forage type, time of application, method of application and the product applied. The legume content of the stand is important in determining the nitrogen requirements. With proper inoculation, forages with high proportion of legumes (greater than 60 per cent) require little or no nitrogen fertilizer. Forage stands with little or no legume content may require 100 lbs nitrogen per acre or more in order to optimize productivity. Stands with 40 to 60 per cent legume will require more moderate amounts of nitrogen fertilizer.

Phosphorus, potassium and sulphur fertilizer requirements will also vary with the forage and soil type. Legumes are heavy sulphur feeders, so soil that is adequate in sulphur for grass may be deficient for a legume or legume-grass stand.

Phosphorus and potassium don't move much in the soil. In the establishment year, take advantage of the opportunity and incorporate them prior to seeding. Broadcast application is currently the only practical method of applying fertilizers to an established stand. The effectiveness can be improved by paying careful attention to timing. Fertilizers are most effective when applied in early spring under dryland conditions. In high rainfall areas and under irrigation, nitrogen fertilizer tends to be more effective when it is split into two applications, early spring and after the first cut. This will generate a more uniform level of production between the two cuts.

Product also makes a different. Ammonium nitrate is generally more effective than urea when broadcasted on an established stand, but more research is needed to properly identify conditions that may affect urea efficiency. If ammonium nitrate cannot be obtained, urea or other nitrogen sources will still produce an economic return. The effectiveness of urea in the establishment year can be improved by placing it below the soil surface in bands less than 9 inches apart.

Forage crop response to fertilizer application is directly related to the amounts and distribution of growing season precipitation and the ability of the soil to store water. In the drier areas of the province and on some sandy soils, response from fertilizers will be quite low because of limited water. Even in wetter areas, the amount and timing of seasonal precipitation can cause variation in stand response. However, under almost all soil moisture conditions, responses occur when fertilizers are applied to moderately to severely deficient soils.

The first step in forage management is establishing a vigorous stand. Establishment programs should include:

- Soil test to assess the fertility status of the soil and any other limitations such as pH and salinity,
- Select the best forage species and variety for the soil type and climate,
- Incorporate fertilizers prior to seeding,
- Inoculate legumes, and
- Use appropriate seeding rates and methods.

Fertilizer application to an established forage stand will pay dividends in terms of both the yield and longevity of the stand. To improve stand productivity, follow these practices:

- Soil test to determine the type and amount of fertilizer,
- Sample soil and tissue from poor growth areas to diagnose problems,
- Apply fertilizer annually rather than using large one time only applications in the year of seeding,
- Fertilize in early spring rather than in fall or late spring,

- Split nitrogen applications between early spring and after the first cut,
- Apply ammonium nitrate rather than urea,
- Lime acid soils to prolong the life of the forage stand.
- A well thought out fertilizer program will increase yield,

extend stand life and improve forage quality. In future issues, specific management practices will be examined in greater detail.❐

SOIL SEARCHING

September seems to be the month when I get involved with water. Last year at this time I spent a week floating down the Red Deer River. Last week I spent three days in Lethbridge at the Agricultural Impact on Water Quality Workshop. These two experiences got me thinking about the relationships between water, cow flops, fashion foot wear, and death by misadventure. Now for some of you the links will be obvious. If that is the case, I suggest you seek professional help. You probably have some wires crossed. For those of you without wiring problems let me explain.

On my river trip, I had two sets of boating shoes. One thing I like about canoeing is you can travel in style. The more comfortable pair was open toed sports sandals. They allowed my feet to dry quickly and since Indian Summer was in its glory cold feet were not a problem. The second set was an old pair of canvas high top sneakers. You know the kind with the rubber toe cap. I wore the sandals for the first few days without much thought. On about day two, I stubbed my toe on a rock while walking the canoe over a gravelbar. Day three, I stepped out of the canoe to check what looked like a likely camping spot and blundered into a patch of prickly pear. The damage was not serious, but I did end up with a couple of stickers in my foot. From then on I wore the sneakers and put up with the minor discomfort of wet gritty feet.

On the last day of the trip, I pulled out at Dinosaur Provincial Park. While walking up the bank, I stepped on something that squirmed under foot. Well in the next few seconds I simultaneously set two world records. The first was the altitude record for human powered flight. The second was for the longest backward standing broad jump. I am doubly proud of these records because, to my knowledge, they had never before been attempted with four feet of rattlesnake connected to the athlete's foot. Fortunately I wasn't snake bit. The rattler stuck his fangs in the toe cap of my sneaker. If I had been wearing my sandals my reign as world record holder might have been short lived.

By now you're asking yourself, "What the hell does this article have to do with water quality?" Well, we've known for decades that some farming practices reduce water quality. We've got a few stickers in our feet with things like nitrate leaching from feedlots and perhaps stubbed a toe with issues likefertilizer runoff into lakes and streams. As yet we haven't stepped on a rattlesnake but that doesn't mean the snakes aren't out there. Unless agriculture takes some precautionary measures in the next few years we may well get snake bite.

It's certainly happened elsewhere. In parts of both Europe and the U.S.A., agriculture is dealing with various forms of draconian legislation. These new laws place severe restrictions on farm practices. In many places, the work to develop new technologies has not kept up with the restriction of older practices. Farmers are caught between a snake and the river. They're either going to get bit by legislative teeth if they break the law or take a financial bath trying to conform without viable options.

Now let's get back to the water quality workshop. The water workshop was an eye opener. It made me aware that we are in snake country. What surprised me most was the number of different agencies involved in the water issue. There are a lot of dedicated knowledgeable people out there putting their efforts towards maintaining Alberta's water supply in top condition. The unfortunate part is that they don't talk to one another enough. The workshop opened up the lines of communication. Hopefully they will stay open.

Another surprise was the general agreement on what issues were important. With respect to agriculture, nutrient movement to surface and groundwater was the number one issue. Pesticide contamination was considered by most people as important but secondary. A number of people I talked to agreed that pesticides were more a problem of public perception than actual environmental damage.

There was a lot of talk about monitoring water quality. However, most people agree that prevention of pollution rather than monitoring is where research and extension efforts should be focused. Agriculture needs to examine the way it manages nutrients and get rid of practices that contribute to water pollution. At the same time, researchers must develop viable alternative practices. Equally important research needs to be focused at the landscape level. Small plot work will not give complete answers to water quality questions.

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GRAZING, GREENFEED AND HERBICIDE

Denise Maurice
Alberta Agriculture

Grazing and/or Feed Restrictions on Common Herbicides as per Product Labels.	
Achieve DG	Do not graze or cut for hay, immature crops treated with Achieve DG amy not be fed to livestock. Studies to support this have not been completed.
Ally	No restrictions.
Assert	Do not graze or feed as silage or hay. Straw from harvested crop may be fed.
Avadex BW	No restrictions.
Avenge	Do not graze or feed cereals for 56 days after treatment.
Banvel	Do not graze or feed to slaughter animals for 30 days after treatment. May be grazed or fed to dairy animals.
Buctril M Pardner	May be grazed or harvested for feed 56 days after treatment.
Dyvel	Do not graze or harvest for livestock feed prior to crop maturity.
Estaprop Diphenoprop 600	No grazing restrictions specified.
Fortress	Do not graze or feed to livestock.
Hoe-Grass 284/Hoe-Grass II	Do not graze treated cereal crops prior to maturity.
Kil-Mor	Do not graze or use for livestock feed within 7 days of application.
Laser	Do not graze treated fields prior to harvest.
Lontrel	Do not graze or use for livestock feed within 7 days of application.
Mataven L	Do not graze or feed treated wheat before maturity. Straw can beused forbedding or feed after harvest of the crop. Do not graze or harvest forage grasses or legumes for feed in the yearof treatment.
MCPA	Do not graze dairycattle within 7 days of spraying.
Refine Extra	Do not graze or harvest for livestock feed within 7 days of application.
Trifluralin	Do not graze or harvest for livestock feed within the year of treatment.
Stampede 360 Stampede CM	Do not graze or harvest for livestock feed within 30 days of treatment.
Target	Do not graze or use for livestock feed within 7 days of application.
TCA	Do not graze treated areas for at least 24 hours.
Tordon 202C	Do not feed treated plant material to meat animals being finished for slaughter, or to dairy animals within 14 days of treatment. See label for precautions on use of manure when treated crop is fed.
Triumph Plus	Do not graze treated fields prior to harvest.
2,4-D	Do not graze for 24 hours after treatment.

Snow, hail and severe August frost in many parts of Alberta have left many farmers with damaged crops. Many producers have chosen to graze or harvest their cereals for greenfeed rather than wait and take a chance on getting nothing.

A sticky point in this approach is that many herbicide labels contain warnings such as "Do Not Graze or Harvest for Livestock Feed!!" The table gives a listing of grazing and feeding restrictions for treated cereal crops. A lot of this table is unwelcome news because it doesn't leave a lot of options for growers.

A potential hazard from feeding treated crops is that pesticide residues can end up in the meat or milk. This is of most concern to the dairy industry. Before using feed treated with herbicides, make darn sure you haven't used a restricted product that may show up in milk.

In addition to meat and milk, future crops are also at risk if the manure generated from treated greenfeed is spread. For example, the active ingredient in Tordon 202C (picloram) is concentrated in manure and can persist in the soil for many months at levels harmful to subsequent crops.

In some cases, for example Avenge, the restrictions are clear cut and based on research results. In others the restriction is due to lack of data. The effects of feeding treated crops is not known. Testing animal response is expensive. It's easier and cheaper for manufacturers to simply say "DO NOT Graze!!" than to do thousands of dollars worth of studies to determine what and when you may feed.

This is not a complete list. There are other herbicides which may cause similar problems. So it's best to contact your local chemical rep or district agriculturist for specific information if you have any doubts.

Another problem with damaged crops is the accumulation of toxic levels of nitrate. In recent weeks, the Agricultural Soil and Animal Nutrition Laboratory has tested some 2000 feeds for nitrate. Approximately 25 per cent will require blending with low nitrate feed before they are safe for animal consumption. Nitrate content is just one aspect to consider. In general greenfeed and forage quality is down so producers are well advised to consider analysis of protein, energy, calcium, and phosphorus as well as nitrate.

In Alberta, a number of private sector labs can perform feed analysis at reasonable cost and with a rapid turn around time. Alberta Agriculture staff are ready to assist farmers with ration balancing once they have obtained the necessary analytical data.❑

Table courtesy of Mark Goodwin, Manitoba Agriculture.

DIAGNOSTIC FIELD SCHOOL Off and Running!!

Ray Dowbenko
Sherritt Gordon

Sherritt Fertilizers' 1st Diagnostic Field School was held July 14 and 16 at the Soil Science Department's Ellerslie Research Farm near Edmonton Alberta. Two groups of fertilizer retailers joined Sherritt, Soils Branch and Crop Protection personnel for investigative field discussions. The project provided an interactive setting in which agronomists, researchers and retailers could discuss various aspects of crop management including soil fertility, weed control and crop diseases.

The concept of a field school was first put forward in 1989, but the actual development of a curriculum had to wait until the past year. The intent of the school was to:

- Provide agronomic training in critical service and diagnostic areas.
- Allow for discussion and communication of ideas and concerns related to agriculture across a wide spectrum of extension and research professionals from industry and government.
- Act as a feedback mechanism by which crop production concerns and questions can be studied and answered while fostering future development of the Diagnostic Field School.
- Aid in the recognition of problems in field crops by staging these problems and allowing students hands on experience in diagnosis and recommendation under expert guidance.

Topics covered in this years school included nitrogen placement methods, legume inoculation, rooting zone restrictions, seed quality, fungicide treatments, fertility-disease interactions, residual herbicide damage, herbicide tank mixes, and herbicide resistant weeds.

The 3 main topics -fertility, disease and herbicides- were set-up to show the interactions between crop limiting factors. This stressed importance of an integrated approach to solving problems in the field. For example, the importance of quality seed, plant populations and seedbed conditions were discussed in relation to getting the most out of fertility and herbicide programs.

With over a 180 demonstrations, it is impossible to review all the topics discussed. It is, however, safe to say that a number of interesting points were made and that the teachers learned as much as the students. Every participant left having learned new skills that will help them deal with crop production problems. Additionally, each participant was provided with a Diagnostic Field School Notebook designed to assist them in the further development and application of their new skills.

At the end of each day, each participant was asked to fill out a questionare. The responses indicated that the school was a resounding success and should be held in 1993. The 1993 program will likely be stretched to 2 days and include a tour to research locations in the surrounding area.

The enthusiasm of the students and Alberta Agriculture's research people made the 1992 Diagnostic Field School a success. Our thanks to the 1st year participants and an early welcome to those of you who will be attending next year.❑

30th Annual Alberta Soil Science Workshop

The 1993 workshop will be held February 22-24 in Edmonton. Plenary sessions will be built around the theme "Research, Education, and Extension." The workshop will have a new flavor this year with the introduction of volunteer poster sessions in addition to the the traditional oral presentations. Another new feature on the 93 model, will be cash awards for the best oral presentations by students.

Abstracts for consideration in the volunteer sessions must be in to the organizing committee by November 13. If you're interested in submitting a paper or poster call Ray Dowbenko (403-454-9521) or Len Kryzanowski (403-427-6361) for further information.

Soil Searching Continued

I think there are three main areas that need to be worked on. The first is manure handling and disposal practices. I don't just mean large feedlots. An Alberta Environment study showed that the main contributors to nutrient loading of Pine Lake were three rather small livestock operations. Researchers need to develop good disposal alternatives for each size of operation. Not an easy task, but the livestock industry is too important a part of Alberta's economy to let it get into environmental difficulty.

The second practice that needs examination is summerfallow. I suspect summerfallow is a major contributor to nutrient loading. Conventional summerfallow has got to go. Both from a soil quality and a water quality standpoint. Chemical fallow needs to be looked at closely. We need to know if it's contributing to water pollution.

Finally there are fertilizers. I don't think fertilizers are near the culprit in this part of the world that they are in other places. But we have to be sure. This means examining fertilizer application methods in detail. We know that a good portion of the fertilizer applied never makes it into the plant. Misapplied nitrogen, for example, can be subject to losses of up to 70-80 percent in some years. That nitrogen has to be going somewhere. We have to plug the hole. Research in this area will also result in more efficient and cost effective use of fertilizers in Alberta farm fields.

Water quality is a major issue in the world today. In Alberta the impact of agriculture on water quality is an emerging issue. We're fortunate that the problems right now do not appear to be large. We have an opportunity, thanks to a little foresight on the part of some agricultural leaders, to put on our snake boots. Coordinated action over the next five to ten years will ensure that Alberta continues to be a land of clean water in the twenty-first century.

DJH

New and Improved, theSoil and Crop Management Branch

The Soils and the Crop Protection Branches have been officially amalgamated into a new Soil and Crop Management Branch. As part of this merger, branch staff will be moved to (or near) the O.S. Longman building which has housed the Soil and Animal Nutrition Laboratory for many years.

While all of the nitty gritty details have not been ironed out, it is safe to say that combining the expertise from Soils and Crop Protection into one branch will allow Alberta Agriculture to better meet producer and industry demands for multidisciplinary research and diagnostic capabilities.

Look for a more detailed description of the structure and personnel of the new Soil and Crop Management Branch in the next issue of SOILutions.

Local Agrologists Honoured

Two local agrologists were awarded the honour of "Distinguished Agrologist" at the annual AIA meetings in Grande Prairie this past June.

Lacombe district agriculturist, Neil Miller, was honoured for his exceptional efforts in agricultural extension. University of Alberta Professor of Soil Science, Dr. Marvin Nyborg, was similarly recognized for his applied research efforts.

Good going guys, congratulations and keep up the good work!!

I was in a farmer's barn the other day when I noticed he had a pig with a wooden leg. So I asked him, "Frank, why does your pig have a wooden leg?"

"Let me tell you," said the farmer, " We owe a lot to that pig. One night last year there was a fire in the barn. Well that pig raised such a rucus that he woke me up in time to put out the fire and save the stock and the barn."

"But that doesn't explain why the pig has a wooden leg."

"Let me tell you, I'm indebted to that pig. Six months ago my son fell through the ice on the pond. Well he would have drowned if that pig hadn't grabbed him by the jacket and pulled him out."

By this time I was getting somewhat exasperated. "Frank," I said, "just tell me why the damn pig has a wooden leg?"

"Well let me tell you," said Frank, "A pig that good. You just can't eat him all at once."

SOILutions is published three times a year by Soil and Crop Management Branch, Alberta Agriculture. Your comments on current contents, ideas and contributions for future articles are welcome. For further information phone, fax, or write *Dan Heaney*, Soil and Animal Nutrition Laboratory, 905 O.S. Longman Bldg., 6909-116 st, Edmonton, Alberta, T6H 4P2, Phone (403)427-6361, Fax (403) 427-1439 **OR** *Elston Solberg,* Soil and Crop Management Branch, J.G. O'Donoghue Bldg., 7000-113 st, Edmonton, Alberta, T6H 5T6. Phone (403) 427-2530, Fax (403) 422-9745.